



22q13.3 deletion syndrome

22q13.3 deletion syndrome, which is also commonly known as Phelan-McDermid syndrome, is a disorder caused by the loss of a small piece of chromosome 22. The deletion occurs near the end of the chromosome at a location designated q13.3.

The features of 22q13.3 deletion syndrome vary widely and involve many parts of the body. Characteristic signs and symptoms include developmental delay, moderate to profound intellectual disability, decreased muscle tone (hypotonia), and absent or delayed speech. Some people with this condition have autism or autistic-like behavior that affects communication and social interaction, such as poor eye contact, sensitivity to touch, and aggressive behaviors. They may also chew on non-food items such as clothing. Less frequently, people with this condition have seizures.

Individuals with 22q13.3 deletion syndrome tend to have a decreased sensitivity to pain. Many also have a reduced ability to sweat, which can lead to a greater risk of overheating and dehydration. Some people with this condition have episodes of frequent vomiting and nausea (cyclic vomiting) and backflow of stomach acids into the esophagus (gastroesophageal reflux).

People with 22q13.3 deletion syndrome typically have distinctive facial features, including a long, narrow head; prominent ears; a pointed chin; droopy eyelids (ptosis); and deep-set eyes. Other physical features seen with this condition include large and fleshy hands and/or feet, a fusion of the second and third toes (syndactyly), and small or abnormal toenails. Some affected individuals have rapid (accelerated) growth.

Frequency

At least 500 cases of 22q13.3 deletion syndrome are known.

Genetic Changes

22q13.3 deletion syndrome is caused by a deletion near the end of the long (q) arm of chromosome 22. The signs and symptoms of 22q13.3 deletion syndrome are probably related to the loss of multiple genes in this region. The size of the deletion varies among affected individuals.

A ring chromosome 22 can also cause 22q13.3 deletion syndrome. A ring chromosome is a circular structure that occurs when a chromosome breaks in two places, the tips of the chromosome are lost, and the broken ends fuse together. People with ring chromosome 22 have one copy of this abnormal chromosome in some or all of their cells. Researchers believe that several critical genes near the end of the long (q) arm of chromosome 22 are lost when the ring chromosome 22 forms. If one of the

chromosome break points is at position 22q13.3, people with ring chromosome 22 have similar signs and symptoms as those with a simple deletion.

Researchers are working to identify all of the genes that contribute to the features of 22q13.3 deletion syndrome. They have determined that the loss of a particular gene on chromosome 22, *SHANK3*, is likely to be responsible for many of the syndrome's characteristic signs (such as developmental delay, intellectual disability, and impaired speech). Additional genes in the deleted region probably contribute to the varied features of 22q13.3 deletion syndrome.

Inheritance Pattern

Most cases of 22q13.3 deletion syndrome are not inherited. The deletion occurs most often as a random event during the formation of reproductive cells (eggs or sperm) or in early fetal development. Affected people typically have no history of the disorder in their family, though they can pass the chromosome deletion to their children.

When 22q13.3 deletion syndrome is inherited, its inheritance pattern is considered autosomal dominant because a deletion in one copy of chromosome 22 in each cell is sufficient to cause the condition. About 15 to 20 percent of people with 22q13.3 deletion syndrome inherit a chromosome abnormality from an unaffected parent. In these cases, the parent carries a chromosomal rearrangement called a balanced translocation, in which a segment from one chromosome has traded places with a segment from another chromosome, but no genetic material is gained or lost. Balanced translocations usually do not cause any health problems; however, they can become unbalanced as they are passed to the next generation. Children who inherit an unbalanced translocation can have a chromosomal rearrangement with extra or missing genetic material. Individuals with 22q13.3 deletion syndrome who inherit an unbalanced translocation are missing genetic material from the long arm of chromosome 22, which results in the health problems characteristic of this disorder.

Other Names for This Condition

- 22q13 deletion syndrome
- deletion 22q13 syndrome
- deletion 22q13.3 syndrome
- monosomy 22q13
- Phelan-McDermid syndrome

Diagnosis & Management

Genetic Testing

- Genetic Testing Registry: 22q13.3 deletion syndrome
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1853490/>

Other Diagnosis and Management Resources

- GeneReview: Phelan-McDermid Syndrome
<https://www.ncbi.nlm.nih.gov/books/NBK1198>
- MedlinePlus Encyclopedia: Sweating--absent
<https://medlineplus.gov/ency/article/003219.htm>

General Information from MedlinePlus

- Diagnostic Tests
<https://medlineplus.gov/diagnostictests.html>
- Drug Therapy
<https://medlineplus.gov/drugtherapy.html>
- Genetic Counseling
<https://medlineplus.gov/geneticcounseling.html>
- Palliative Care
<https://medlineplus.gov/palliativecare.html>
- Surgery and Rehabilitation
<https://medlineplus.gov/surgeryandrehabilitation.html>

Additional Information & Resources

MedlinePlus

- Encyclopedia: Sweating--absent
<https://medlineplus.gov/ency/article/003219.htm>
- Health Topic: Speech and Communication Disorders
<https://medlineplus.gov/speechandcommunicationdisorders.html>

Genetic and Rare Diseases Information Center

- 22q13.3 deletion syndrome
<https://rarediseases.info.nih.gov/diseases/10130/22q133-deletion-syndrome>

Additional NIH Resources

- National Institute of Neurological Disorders and Stroke: Seizures and Epilepsy: Hope Through Research
<https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Hope-Through-Research/Epilepsies-and-Seizures-Hope-Through>
- National Institute on Deafness and Other Communication Disorders: Autism and Communication
<https://www.nidcd.nih.gov/health/autism-spectrum-disorder-communication-problems-children>
- National Institute on Deafness and Other Communication Disorders: Speech and Language Developmental Milestones
<https://www.nidcd.nih.gov/health/speech-and-language>

Educational Resources

- Boston Children's Hospital: Autism Spectrum Disorder in Children
<http://www.childrenshospital.org/conditions-and-treatments/conditions/autism-spectrum-disorders>
- Boston Children's Hospital: Seizures in Children
<http://www.childrenshospital.org/conditions-and-treatments/conditions/seizures>
- Centers for Disease Control and Prevention: Autism Information Center
<https://www.cdc.gov/ncbddd/autism/index.html>
- Centers for Disease Control and Prevention: Intellectual Disability
https://www.cdc.gov/ncbddd/actearly/pdf/parents_pdfs/IntellectualDisability.pdf
- Disease InfoSearch: 22q13.3 Deletion Syndrome
<http://www.diseaseinfosearch.org/22q13.3+Deletion+Syndrome/23>
- MalaCards: phelan-mcdermid syndrome
http://www.malacards.org/card/phelan_mcdermid_syndrome
- March of Dimes: Chromosomal Conditions
<http://www.marchofdimes.org/baby/chromosomal-conditions.aspx>
- Orphanet: Monosomy 22q13
http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=48652
- Unique: Pamphlet about 22q13 deletion syndrome
<http://www.rarechromo.org/information/Chromosome%2022/22q13%20deletions%20Phelan%20McDermid%20syndrome%20FTNW.pdf>

Patient Support and Advocacy Resources

- 22q13 Deletion Foundation
<http://22q13.org/j15/>
- Chromosome Disorder Outreach
<http://chromodisorder.org/>
- National Organization for Rare Disorders (NORD)
<https://rarediseases.org/rare-diseases/phelan-mcdermid-syndrome/>
- Unique: Rare Chromosome Disorder Support Group (UK)
<http://www.rarechromo.org/html/home.asp>
- University of Kansas Medical Center Resource List: Autism
<http://www.kumc.edu/gec/support/autism.html>
- University of Kansas Medical Center Resource List: Developmental Delay
<http://www.kumc.edu/gec/support/devdelay.html>

GeneReviews

- Phelan-McDermid Syndrome
<https://www.ncbi.nlm.nih.gov/books/NBK1198>

ClinicalTrials.gov

- ClinicalTrials.gov
<https://clinicaltrials.gov/ct2/results?cond=%2222q13.3+deletion+syndrome%22>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%2822q13.3+deletion+syndrome%5BTIAB%5D%29+OR+%2822q13+deletion+syndrome%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3240+days%22%5Bdp%5D>

OMIM

- PHELAN-MCDERMID SYNDROME
<http://omim.org/entry/606232>

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